5. COMPLIANCE MONITORING

5.1 Introduction

Compliance monitoring includes protection, performance, and confirmation monitoring (WAC 173-340-410). The CD provides additional details on these three components of compliance monitoring. Lehigh will submit a Compliance Monitoring Plan (CMP) in accordance with the CD that describes how compliance monitoring will be implemented at this Site. The CMP will include a Sampling and Analysis Plan (SAP) and a Quality Assurance Project Plan (QAPP). The remainder of this section summarizes the elements that will be included in the CMP.

5.2 Protection Monitoring

Protection monitoring is used to "confirm that human health and the environment are adequately protected during construction and the operation and maintenance period of an interim action or cleanup action as described in the safety and health plan (WAC 173-340-410(a))."

Protection monitoring will include:

- Health and Safety Plan (HASP) – The existing HASP, last revised in August 2002, will be reviewed and revised as needed to address the potential Site hazards due to construction and operation of the Groundwater Remedy. Each contractor will also prepare a site-specific HASP that evaluates Site hazards and describes mitigation measures to limit the exposure of Site workers to those hazards. The HASPs will be compliant with federal OSHA requirements [29 CFR 1910.120] and Washington Department and Labor Industries Requirements [WAC-296-843-120]. The HASPs will be located on Site during construction and future maintenance and monitoring activities.

- Daily meetings – Site crews will conduct daily "tailgate" meetings prior to field activities to discuss health and safety issues and address concerns.

- Monitoring – Lehigh will periodically assess the Site to evaluate whether Site activities comply with the HASP. Lehigh will also evaluate storm water pollution prevention, erosion control, and waste storage methods and procedures.

5.3 Performance Monitoring

Performance monitoring is used to "confirm that the interim action or cleanup action has attained cleanup standards and, if appropriate, remediation levels or other performance standards such as construction quality control measurements or monitoring necessary to demonstrate compliance with a permit or, where a permit exemption applies, the substantive requirements of other laws (WAC 173-340-410(b))." Performance monitoring is intended to demonstrate that the system, as designed, has been installed in accordance with substantive requirements and is effective in achieving cleanup standards. This demonstration will take place both during construction and during the two year Optimization Phase. As the system is being monitored and tuned during the Optimization Phase, performance monitoring will account for limited and periodic downtimes while the system is not operational, as needed to adjust treatment dosage. Long-term monitoring, as will be described in the CMP, will be conducted to document the effectiveness of the system.

Performance monitoring begins as the Groundwater Remedy is implemented. Performance monitoring will include:

- Closed CKD Pile – Lehigh will monitor waste containment systems as described in the Post-Closure and Maintenance Plan [D&M, 1995].

- Treated Groundwater – Lehigh will collect groundwater samples from groundwater monitoring wells installed just upgradient of

Sullivan Creek. These samples will be analyzed for indicator substances to document progress toward meeting cleanup levels. The data from these samples will be used during the two-year Optimization Phase to adjust treatment variables such as carbon dioxide dosage to improve system performance. Groundwater samples will also be collected from groundwater wells upgradient and within the treatment corridor. The data from these wells will also be used to adjust treatment variables.

- Remnant Plume – Lehigh will collect groundwater samples from existing groundwater Monitoring Wells MW-12, PM-1, PM-5, PM-15, and PM-19 in the remnant plume areas that are not captured by the treatment system. These samples will be analyzed for indicator substances to document progress toward meeting cleanup levels.

- Gravity Drain – The gravity drain will be equipped with a total flow gauge to measure the amount of water captured by the gravity drain. In addition, two piezometers will be installed on the eastern side of State Route 31 near the gravity drain. Groundwater levels will be measured in these piezometers. Groundwater levels will also be collected from existing wells that are not abandoned during Groundwater Remedy construction. Such wells may include MW-8, PM-10, and PM-16. The groundwater level data from the two new piezometers and the existing wells will be combined to evaluate the floodplain groundwater elevation over time. The chemical data from pre-treatment wells may also be used to assess the pH of the captured groundwater plume over time.

5.4 Confirmation Monitoring

Confirmation monitoring is used to "confirm the long-term effectiveness of the interim action or cleanup action once cleanup standards and, if appropriate,

remediation levels or other performance standards have been attained (WAC 173-340-410(c))."

Confirmation monitoring begins once cleanup levels are met in the compliance monitoring wells. Confirmation monitoring activities include:

- Treated Groundwater – After the two-year Optimization Phase, groundwater data will be evaluated for compliance with cleanup levels and NPDES permit levels. Confirmation monitoring samples will be collected from groundwater wells installed downgradient of the treatment system and may involve a mixing zone with Sullivan Creek. These samples will be analyzed for indicator substances and additional chemicals specified in the NPDES permit, if any. Confirmation monitoring will be continued until treatment is no longer needed and a statistical analysis of the data indicates that cleanup levels have been met for two years.

- Remnant Plume – Confirmation monitoring of the remnant plume will be used to evaluate whether the area affected by the remnant plume will continue to meet cleanup levels over the long term. Confirmation monitoring of the remnant plume wells will be continued until statistical analysis of the data indicates that cleanup levels have been met for two years.

Confirmation monitoring data will be analyzed using the data analysis and statistical procedures described in WAC 173-340-720(9) and the guidance document titled *Statistical Guidance for Ecology Site Managers* [Ecology, 1992]. These procedures will be used to demonstrate whether cleanup levels are being met in each compliance monitoring well. With the approval of Ecology, Individual monitoring wells may be removed from the monitoring program as cleanup levels are met.